

WHAT IS CLAIMED IS:

1. A method of making an oxidation protective multiple coating for a carbon/carbon composite, the method comprising:
  - (a) forming an initial coating layer on the carbon/carbon composite by a pack cementation process;
  - (b) coating Si over the initial coating layer to form an Si-coated carbon/carbon composite; and
  - (c) heat-treating the Si-coated carbon/carbon composite to impregnate the initial coating layer, and cracks in the initial coating layer, with Si; thereby forming an SiC layer and an Si layer.
2. The method of claim 1, further comprising oxidizing the Si layer to form an SiO<sub>2</sub> film.
3. The method of claim 1, wherein a vehicle liquid is used to facilitate the coating of Si over the initial coating layer in (b).
4. The method of claim 3, wherein the vehicle liquid is a volatile alcohol.
5. The method of claim 1, wherein the heat-treating in (c) is performed at a temperature of about 1400 °C to about 1600 °C under a pressure of about 10 mTorr to about 1000 mTorr.
6. The method of claim 2, wherein the oxidizing of the Si layer is performed at a temperature of about 400 °C to about 800 °C.
7. A coated carbon/carbon composite made according to the method of claim 1.

8. A coated carbon/carbon composite made according to the method of claim 2.